



## Three new species and one new combination in *Hibiscus* (Malvaceae)

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### Introduction

Ongoing studies of Australian *Hibiscus* L. have revealed the presence of three undescribed species. One of these, *Hibiscus kirstyae* Craven, from the Kimberley Region of Western Australia, appears to be unique within the Australian *Hibiscus* species belonging in sect *Furcaria* DC. This section is defined by a prominently thickened midrib and thickened marginal ribs on the calyx lobes. The glaucous, waxy foliage, sparse aculei and lack of other indumentum set *H. kirstyae* apart from the other species of *H. sect. Furcaria* in Australia, as well as all species known from Asia, Africa (Borssum Walkes 1966; Wilson 1999) and southern India (Sivarajan & Pradeep 1996).

The opportunity arose for me [LC] to cultivate many accessions of *Hibiscus* from north-eastern Australia in a common greenhouse environment in Canberra, and it became evident that three quite distinct species had been erroneously brought together as *H. forsteri* F.D.Wilson. The two newly segregated species, *H. sankowskyorum* Craven and *H. townsvillensis* Craven, occur in north-eastern Australia; *H. sankowskyorum* occurs in the region along the Iron Range road, on the Lockhart River road, and north-west of Cooktown along the McIvor River road; and *H. townsvillensis* occurs in the Mt Spec–Townsville region.

### Abstract

*Hibiscus kirstyae* Craven, *H. sankowskyorum* Craven and *H. townsvillensis* Craven are newly described. These three species all belong in *Hibiscus* sect. *Furcaria* DC. *Hibiscus kirstyae* has no obvious close relationship with the other Australian members of sect. *Furcaria*, whereas *H. sankowskyorum* and *H. townsvillensis* are closely related to *H. forsteri* F.D.Wilson. A new description is provided for *H. forsteri*. *Toliporiti bowersioe* Fryxell is transferred to *Hibiscus* L., as *H. bowersioe* (Fryxell) Craven, since *Toliporiti* Fryxell has been well demonstrated to be an integral component of *Hibiscus*. Modified keys are presented to include the new species.

**Key words:** *Hibiscus* sect. *Furcaria*, *Toliporiti*, new species, new combination

The morphological terminology used here follows Craven et al. (2003). As specified there, indumentum is an especially important source of diagnostic information. The stout, unbranched hairs that commonly occur on the branchlets, epicalyx and calyx of Australian *Hibiscus* sect. *Furcaria* species are termed aculei (sometimes called prickles in other treatments). The aculei are sometimes inserted on tubercles (see Fig. 1g); the aculei themselves sometimes also carry stellate trichomes (see Fig. 1a). The term peduncle is also used in a specific manner following Craven et al. (2003), as some *Hibiscus* species have both a pedicel and peduncle, with a distinct articulation between the two and the indumentum can differ on each of the two parts.

The main portion of this manuscript was in an advanced stage of preparation at the time of Lyn Craven's death in July 2014. Subsequently, the manuscript was revised by Russell Barrett and Matt Barrett. This revision included the addition of keys to complement those published by Wilson and Craven (1995) and Craven et al. (2003), diagnostic characters for each new species, updated information on *H. kirstyae* and a revised description of *H. forsteri*. Additional populations ascribed to *H. forsteri*, but outside the ranges described for the three taxa recognised here, are known with vouchers at BRI that are not represented at CANB and these are yet to be assessed. It is likely that the known ranges of these taxa will increase once the identities of these specimens are determined.

Taxonomy

*Hibiscus kirstyae* Craven, sp. nov.

**Type:** WESTERN AUSTRALIA. Kimberley Region, Morgan River near Theda Station homestead, 17.ii.2005, M.D. Barrett 1589 (holotype: PERTH 7213425, 7213433; isotypes: CANB 527708.1, 527708.2, K).

*Hibiscus* sp. Theda (M.D. Barrett & R.L. Barrett MDB 2144), Western Australian Herbarium, in *FloraBase*,

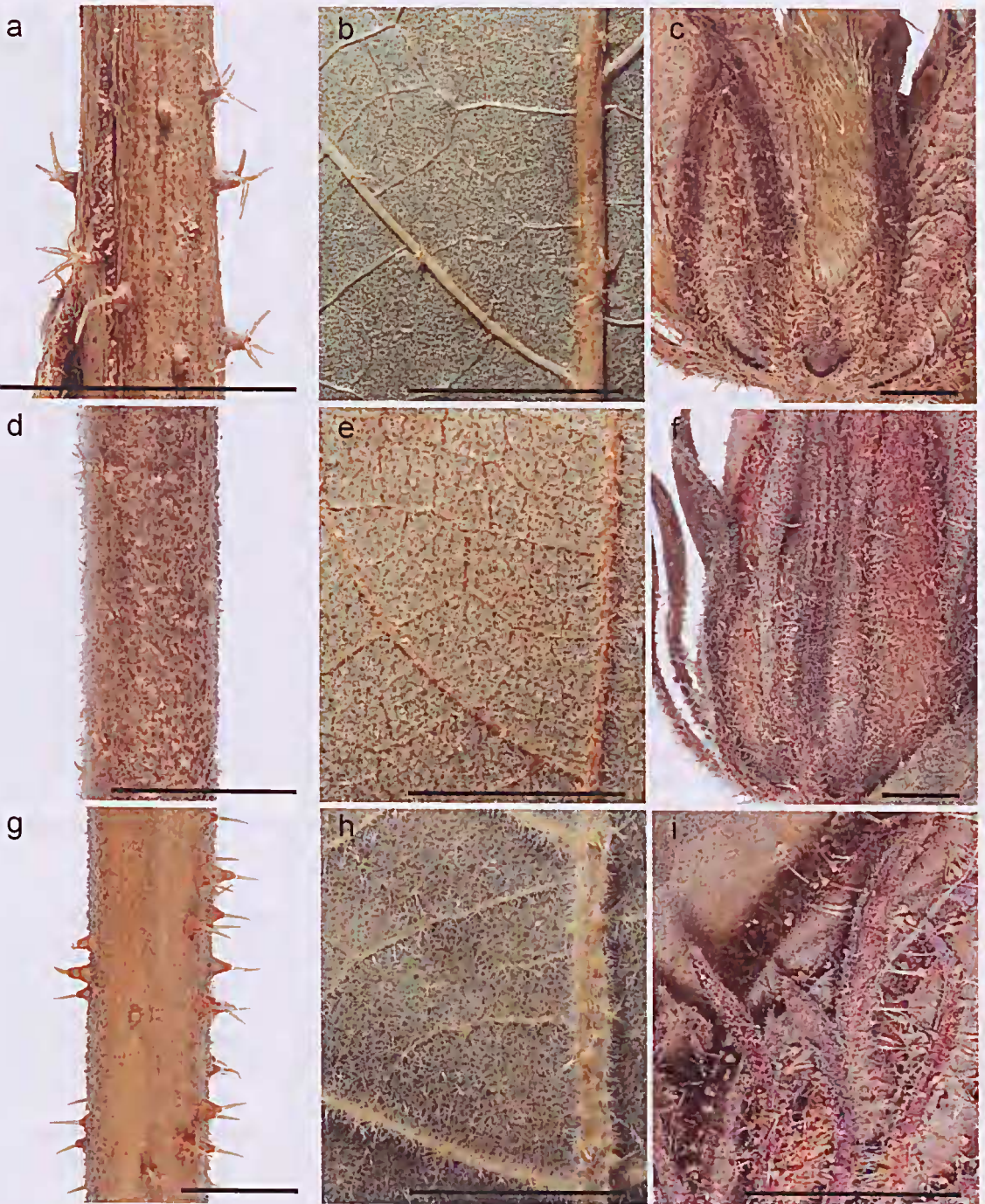
<http://florabase.dpaw.wa.gov.au/> [accessed 22 March 2016].

Single-stemmed *shrub* to 3 m tall. *Branchlets* glabrous (stem of seedlings with very sparse tubercle-based aculei c. 1–1.25 mm long). *Stipules* at length deciduous, glabrous, subulate, unlobed, 8–12 mm long. *Petioles* 70–115 mm long; *climax leaves* with the petiole glabrous, petiole of seedling leaves with tubercle-based aculei. *Leaves* palmately-veined. *Lamina* very broadly ovate, transversely broadly elliptic or broadly elliptic, unlobed, 80–110 mm long, 70–170 mm wide, the margin weakly serrate, base cordate, or truncate, apex rounded, concolorous, with yellowish-pink hairs, the indumentum generally similar on each surface. Abaxial surface with midrib and primary vein indumentum similar to that of the interveinal regions, with sparse aculei, c. 1–1.25 mm long. *Foliar nectary* present at base of the lamina, 5–6 mm long. *Distal leaves* on flowering shoots reduced in shape and size, elliptic, or broadly elliptic (sometimes trilobed), distinctly petiolate on reproductive shoots. *Flowers* solitary in leaf axils, pedunculate, chasmogamous. *Peduncles* well developed, glabrous, 25–80 mm long. *Pedicels* glabrous, 12–15 mm long. *Epicalyx* present, persistent, glabrous, 9–10-lobed, 8–12 mm long, segments free at the base, 0.3 times the length of the calyx at anthesis, incurved, subulate, at the apex entire. *Calyx* at anthesis 5-lobed or -partite but not splitting per se, not adnate to the corolla and not falling with it after anthesis, glabrous between the ribs, lobes with prominent marginal ribs, these glabrous or occasionally pubescent, with sparse aculei, apex very narrowly acute, 25–27 mm long at anthesis, nectary absent. *Petals* yellow with a red nectary at the base, 80–85 mm long. *Staminal column* straight, 5-toothed at the apex, 30 mm long. *Stamens* scattered along distal c. 30 mm of the column (more or less along the entire length). *Anthers* dark purple-red. *Pollen* dark purple-red. *Style* one, 5-branched, with branches c. 1.5 mm long, exerted c. 4 mm beyond apex of staminal

The key to species of *Hibiscus* sect. *Furcaria* in the Northern Territory and Western Australia by Craven et al. (2003) can be modified to include *H. kirstyae* as follows:

- 3. Flowers pedunculate; capsule glabrous or at the apex with a few hairs ..... 3A
- 3A: Leaves entire; epicalyx 0.3 times the length of the calyx; petals yellow ..... *H. kirstyae*
- 3A: Leaves deeply 2–3-lobed; epicalyx 0.5–0.8 times the length of the calyx; petals white ..... *H. meraukensis*
- 3: Flowers not pedunculate; capsule densely hairy ..... 4





**Figure 1.** Indumentum on type specimens in the *Hibiscus forsteri* complex. *Hibiscus forsteri* (Clarkson 8866, CANB 576920.1): **a.** branchlet indumentum (sparse, fine stellate indumentum and prominent aculei with apical stellate hairs); **b.** leaf abaxial indumentum; **c.** epicalyx and calyx indumentum. *Hibiscus sankowskyorum* (Clarkson 7341, CANB 572995): **d.** branchlet indumentum (dense, fine stellate hairs with sparse, obscure aculei); **e.** leaf abaxial indumentum; **f.** epicalyx and calyx indumentum. *Hibiscus townsvillensis* (Craven 10469, CANB 875440): **g.** branchlet indumentum (dense, fine stellate hairs with prominent aculei on tubercles); **h.** leaf abaxial indumentum; **i.** epicalyx and calyx indumentum (note epicalyx apices are distinctly flattened and spatulate). Scale bars = 5 mm. (Photos by Russell Barrett)



column. *Stigmas* entire, capitate. *Ovary* glabrous. *Calyx* in fruit not distinctly inflated or accrescent. *Fruits* dry, dehiscent capsule. *Capsules* 15–18 mm long, glabrous, capsule beak present. *Seeds* glabrous, striate and minutely pectinate-pubescent, angular, subreniform, c. 4 mm long. (Fig. 2)

**Diagnostic characters:** This species is distinguished from all species of Australian sect. *Furcaria* by its glaucous leaves, glabrous branchlets and capsule, 9–10 short epicalyx lobes, and yellow corolla.

**Additional specimens examined:** WESTERN AUSTRALIA. Morgan River, 15.ii.2005, M.D. Barrett 1589 (PERTH); Cultivated in a CSIRO greenhouse, Canberra, ex: Morgan River, Kimberley, (coll. R.L. & M.D. Barrett), iii.2005, L.A. Craven 15049 (CANB 875441); Morgan River, 28.iv.2008, M.D. Barrett & R.L. Barrett MDB 2144 (PERTH 08103062); Morgan River, 17.v.2011, M.D. Barrett 3730 (PERTH).

**Distribution and habitat:** Occurs on two large sandstone pavements 15 km apart near the Morgan River on Theda Station. Each pavement is 0.9–1.2 km long and c. 300 m wide, however, the *Hibiscus kirstyae* populations occupy only a portion of each pavement. *Hibiscus kirstyae* is restricted to ridges away from the pavement margins, presumably to afford them some degree of protection from fire. The type population consists of around 200 individuals that are estimated to live for 3–6 years between fire periods.

**Notes:** Considerable effort has been undertaken to locate additional populations in the region over a period of 12 years, including extensive observations by helicopter, but no further populations have been located to date.

The glabrous capsule is unusual amongst Australian indigenous species, shared only with *Hibiscus meraukensis* Hochr. *H. meraukensis* is distinguished from *H. kirstyae* by having deeply 2–3-lobed leaves, longer epicalyx lobes more than half as long as the calyx lobes, and white petals.

Flowering observed between January and April.

Plants are obligate seeders, being killed by fire.

From a distance the glaucous leaves, yellow flowers and tall shrub habit have the appearance of a *Calotropis* R.Br. with yellow deciduous leaves, which are noxious weeds elsewhere in the Kimberley.

**Conservation status:** *Hibiscus kirstyae* is rare. Listed as Priority One under Department of Parks and Wildlife

Conservation Codes for Western Australian Flora as *Hibiscus* sp. Theda (M.D. Barrett & R.L. Barrett MDB 2144) (Jones 2015), and the IUCN category Vulnerable (VU D1+2) is considered appropriate (IUCN 2012).

**Etymology:** This species is named in honour of Christine (Kirsty) L. Craven, wife of Lyn Craven, in recognition of her many years of support and patience during many family 'holidays' undertaken to collect plants.

### *Hibiscus forsteri* species complex

Wilson and Craven (1995: 442) noted that Paul Forster (pers. comm. 1994) recognised that at least two forms were included under their concept of *Hibiscus forsteri*, but, at that time, the available material was insufficient to define additional taxon boundaries. The specimens noted by Forster to differ from typical *H. forsteri* are herein described as *H. sankowskyorum*. Growing a range of specimens under common conditions allowed for critical comparison and recognition of three species. *Hibiscus forsteri* and *H. sankowskyorum* occur in relatively close proximity to each other, but have not been noted to co-occur, growing on different substrates. A revised key to all Queensland and New South Wales species of *Hibiscus* sect. *Furcaria* is presented to distinguish the two new species from *H. forsteri* and includes *H. zonatus* F.Muell., which has been recorded from NW Queensland (since Craven et al. 2003).

### *Hibiscus sankowskyorum* Craven, sp. nov.

**Type:** QUEENSLAND. Cook District: Brown Creek crossing on the road to Iron Range, on levee of the stream in *Eucalyptus tetrodonta*–*E. nesophila* woodland, 9.viii.1987, J.R. Clarkson 7341 (holotype: CANB 572995.1, 572995.2 (mounted on two sheets); isotypes: BRI, L, QRS, all n.v.).

*Hibiscus forsteri* auct. non F.D. Wilson: F.D. Wilson & Craven, *Austrobaileya* 4(3): 439–442 (1995), p.p., as to S.T. Blake 23449; J. Brass 19181; J.R. Clarkson 7341; J.R. Clarkson 9078 & V.J. Neldner; R. Coveny & P. Hind 7100; Cummings 100; P.I. Forster 4249; P.I. Forster 9040; J. Wrigley & I. Telford NQ1386.

*Shrub, or tree, apparently evergreen, often multistemmed from ground level, perhaps as a response to fire, 2–3(–10) m tall, dbh up to 20 cm. Branchlets hairy, with stellate*

**Revised key to species of *Hibiscus* sect. *Furcaria* in Queensland and New South Wales based on Wilson and Craven (1995)**

1	Nectary present on calyx midrib .....	<i>H. diversifolius</i>
1:	Nectary absent .....	2
2	Capsule glabrous or at the summit sparsely pubescent; pedicel glabrous or aculeate .....	<i>H. meraukensis</i>
2:	Capsule sparsely or densely pubescent throughout; pedicel stellate-pubescent and with or without aculei .....	3
3	Flowers pedicellate and pedunculate .....	4
3:	Flowers pedicellate, peduncle absent .....	5
4	Branchlets with very dense, velvety, simple to stellate fine hairs and simple to branched aculei to 2 mm long; capsule densely pubescent .....	<i>H. splendens</i>
4:	Branchlets with 1–4-fid soft and flexible hairs to 3 mm long; capsule sparsely pubescent .....	<i>H. saponarius</i>
5	Epicalyx segments distinctly flattened and slightly to markedly widened towards the apex .....	6
5:	Epicalyx segments not flattened or if somewhat flattened, not widened towards the apex .....	8
6	Branchlets with scattered aculei that are often obscured by stellate indumentum; stellate indumentum dense (sometimes sparse with age); evergreen shrub or tree; habitat on granite substrates .....	<i>H. sankowskyorum</i>
6:	Branchlets with prominent aculei; indumentum generally sparse to moderately dense; evergreen or deciduous; habitat on granite or sandstone substrates .....	7
7	Aculei tipped with stellate hairs; indumentum very sparse, stellate; deciduous shrub; habitat on sandstone substrates .....	<i>H. forsteri</i>
7:	Aculei tipped with a single hair; indumentum moderately dense, simple and stellate; evergreen tree; habitat on granite substrates .....	<i>H. townsvillensis</i>
8	Calyx sparsely stellate-pubescent and/or aculeate, the indumentum not distinctly coloured .....	<i>H. divaricatus</i>
8:	Calyx densely stellate-pubescent and without aculei, the indumentum often distinctly coloured (straw- to rust-coloured when dry) .....	9
9	Leaves often deeply 3-lobed, lobes acute .....	<i>H. heterophyllus</i>
9:	Leaves usually entire, or if shallowly 3-lobed, lobes obtuse .....	<i>H. zonatus</i>

indumentum of two hair size classes: numerous dense fine short stellate hairs 0.2–0.4 mm long, and scattered tubercle-based coarse stellate hairs 0.4–0.8 mm long; tubercle-based aculei rarely occur (may be 1-rayed coarse stellate hairs). *Stipules* at length deciduous, hairy, subulate, unlobed, 6–13 mm long with stellate hairs. *Petioles* 40–95 mm long; *climax leaves* with the petiole indumentum similar to that of branchlets (lacking aculei). *Leaves* palmately-veined when trilobed, or pinnately-veined when unlobed. *Lamina* narrowly ovate, or ovate, or broadly ovate, unlobed, or rarely shallowly 1- or 3-lobed with the lobes shorter than wide, 120–190 mm long, 90–180 mm wide, the margin serrate (rarely crenate), base cuneate, or truncate, the apex acute, or obtuse, concolorous, with whitish hairs, indumentum more dense on abaxial surface. Abaxial surface with the midrib and primary vein indumentum similar to that of the interveinal regions, with moderately to very dense, mainly fine stellate hairs. *Foliar nectary* present at base of the lamina, 4–7 mm long. *Distal leaves* on flowering

shoots reduced in shape, narrowly elliptic, or elliptic, or narrowly ovate, distinctly petiolate on reproductive shoots. *Flowers* solitary in leaf axils, not pedunculate, chasmogamous. *Pedicels* hairy, 15–38 mm long, with stellate hairs. *Epicalyx* present, persistent, with fine stellate hairs and tubercle-based coarse stellate hairs, 9–11-lobed, 17–27 mm long, segments flattened, free at the base, shorter than the calyx, or equally as long as the calyx, 0.6–1 times the length of the calyx at anthesis, straight, or incurved, narrowly but distinctly spatulate, or subulate, with apex entire. *Calyx* at anthesis not splitting (5-lobed or -partite but not splitting per se), not adnate to the corolla and not falling with it after anthesis, whitish, with fine and coarse moderately dense or very dense stellate hairs, evenly distributed on the abaxial surface, lobes narrowly triangular with prominent marginal ribs, apex acute, 25–35 mm long at anthesis, nectary absent. *Petals* white, red petal spot present, 60–95 mm long. *Staminal column* straight, 5-toothed at the apex, c. 45 mm long. *Stamens* scattered





**Figure 2.** *Hibiscus kirstyae* a. habitat on shallow sand over sandstone pavement, type location, Theda Station (Barrett & Barrett MDB 2144); b. habit on sandstone pavement; c. leaves with dentate margins and glaucous appearance; d. glaucous stems; e. centre of flower with one petal removed to show red nectary and epicalyx; f. flower, calyx and epicalyx. (Photos by Russell Barrett)

along distal c. 25 mm of the column, inserted singly. *Anthers* dark red. *Pollen* dark red. *Style* one, 5-branched, branches c. 4 mm long, exserted c. 14 mm beyond apex of staminal column. *Stigmas* entire, capitate. *Ovary* hairy. Calyx in fruit not distinctly inflated or accrescent. *Fruits* dry, dehiscent, a capsule. *Capsules* ovoid, c. 20 mm long with ascending dense hairs, capsule beak present. *Seeds* glabrous. (Figs 1d–f, 3)

**Diagnostic characters:** Distinguished from Australian members of *Hibiscus* section *Furcaria* by the following combination of characters: evergreen large shrub or small tree; flattened, often spatulate epicalyx segments; sparse, small aculei tipped by short stellate hairs and otherwise short, very dense indumentum on the branchlets and leaves.

**Specimens examined:** QUEENSLAND. Cook District: 53 km from Cooktown on Old Mclvor Road, 6 km from Hope Vale Turn Off, 21.v.1970, S.T. Blake 23449 (BRI, n.v., CAN8 310413); Brown's [Brown] Creek, Pascoe River, Cape York Peninsula, 13.vi.1948, L.J. Brass 19181 (CAN8 192489); 9.2 km north of the Lockhart River Road on the track to Wattle Hill, 8.viii.1991, J.R. Clarkson 9078 & V.J. Neldner (BRI, n.v., CAN8 572996, QRS, n.v.); 49.6 km (by road) N of Cooktown, on the Cooktown Mclvor River Road, 5.3 km N of southern turnoff to Hopevale Mission, 31.v.1992, 8.J. Conn 3595, E.A. Brown & A.N.L. Doust (NSW, 256566, n.v., QRS 114277); CSIRO glasshouse, Canberra, ex: 27 miles from Cooktown on Mclvor River road, 9.vi.1983 L.A. Craven s.n. (CANB 332429); From cuttings, G. Sankowsky's garden, Tolga, Atherton Tableland, ex: Browns Creek, Iron Range road, (coll. G. Sankowsky) 25.x.1997, L.A. Craven, G. Sankowsky, J.A. Matarczyk 10012 (CAN8 498126); CSIRO glasshouse, Canberra, ex: 9.2 km north of the Lockhart River, (coll. Clarkson 9078) 2001, L.A. Craven 10466 (CANB 875439); CSIRO glasshouse, Canberra, ex: 9.2 km north of the Lockhart River, (coll. Clarkson 9078), i.1998, L.A. Craven 15051 (CAN8 875443); CSIRO glasshouse, Canberra, ex 27 miles NW of Cooktown along Mclvor road, (coll. Wrigley & Telford NQ1386), i.1998, L.A. Craven 15052 (CANB 875444); Canberra Botanic Gardens, ex: Mclvor River road, as cuttings 722449 (Coll. I.R. Telford & J. W. Wrigley NQ 1386), 17.ii.1977, D.J. Cummings 100 (C8G 67595); Yuruga, Atherton Tablelands, Walkamin ex Heathlands, [actually from Brown's Creek] 6.viii.1996, S. Donaldson 955, I.R. Telford & L.W. Cayzer (C8G 9612927); Garraway Hill, southern slopes, 17.vii.1991, P.I. Forster 9040 (BRI, n.v., CANB 573001); 33 miles [53 km] from Wenlock on the Iron Range road [Portland Roads road], vii.1968, C.H. Gittins 1796 (CAN8 743794); Claudie River, 26.vi.1972, A.K. Irvine 213 (CANB 690231, QRS, n.v.); Iron Range Road, E of crossing over Pascoe River, 15.v.2003, D.L. Jones 18865 & B. Gray (CAN8 598258, QRS, n.v.); Brown's Creek, ii.2003, Sankowsky s.n.

(CANB 875445); Canberra Botanic Gardens, ex: 27 miles NW of Cooktown along Mclvor River road, i.1974, I.R. Telford s.n. (C8G 67473); 27 miles [43km] NW of Cooktown along Mclvor River road, 18.vi.1972, J. Wrigley NQ1386 & I. Telford (C8G 48220).

**Distribution and habitat:** Occurs in far north Queensland, in the Cooktown and Lockhart River areas, where it has been recorded growing on granite substrates.

**Conservation status:** Restricted in distribution but population sizes are not well documented so the IUCN category Data Deficient (DD) is considered appropriate (IUCN 2012).

**Etymology:** The epithet honours Garry and Nada Sankowsky for their many collections and efforts in cultivating Malvaceae, including this species, provided to LC for study over a period of many years.

**Notes:** The epicalyx in Clarkson & Neldner 9078 in part is quite short and it may be that a population of this species may occasionally contain plants with a reduced epicalyx as occurs, for example in *Hibiscus zonatus*.

The holotype is mounted on two sheets marked as sheets 1 and 2. As plants are quite large, a single sheet is not sufficient to incorporate all the relevant morphological features and variation present.

### *Hibiscus townsvillensis* Craven, sp. nov.

**Type:** CULTIVATED. CSIRO glasshouse, Black Mountain, Australian Capital Territory, xii.2003, L.A. Craven 10469 (holotype: CANB 875440.1, 875440.2, 875440.3, 875440.4, 875440.5, 975440.6 (mounted on 6 sheets); isotypes: A, ASU, B, BISH, BRI, CNS, G, K, L, MEL, NY, P, US).

*Hibiscus forsteri* auct. non F.D. Wilson: F.D. Wilson & Craven, *Austrobaileya* 4(3): 439–442 (1995), p.p., as to *B. Hyland* 5916.

*Tree* up to 10 m tall, apparently evergreen. *Branchlets* hairy, with scattered tubercle-based aculei c. 2 mm long and scattered to moderately dense tubercle-based stellate indumentum of two hair size classes: fine short hairs, 0.2–0.3 mm long and coarse tubercle-based hairs, 0.5–0.7 mm long. *Stipules* caducous, hairy, filiform, or subulate, unlobed, 6 mm long, with stellate hairs. *Petioles* 65–90 mm long; *climax leaves* with the petiole indumentum dissimilar to that of branchlet (often lacking aculei and coarse stellate hairs). *Leaves* pinnately-veined (approaching palmate in trilobed leaves). *Lamina*





Figure 3. Part of Holotype specimen of *Hibiscus sankowskyorum* (Clarkson 7341, CANB 572995)



ovate, unlobed or shallowly 1- to 3-lobed, hairy, 170–260 mm long, 90–150 mm wide, the margin crenate, or serrate, the apex obtuse, or acute, concolorous, with whitish hairs, the indumentum generally similar on each surface. Abaxial surface of lamina moderately dense, fine and coarse stellate hairs, the midrib and primary vein indumentum dissimilar to that of the interveinal regions. *Foliar nectary* present at base of the lamina, 4–8 mm long. *Distal leaves* on flowering shoots not reduced in shape but reduced in size, ovate, or narrowly elliptic, distinctly petiolate on reproductive shoots. *Flowers* solitary in leaf axils, not pedunculate, chasmogamous. *Pedicels* hairy, 45–60 mm long, with stellate hairs and aculei. *Epicalyx* present, persistent, hairy with aculei and stellate hairs (stellate hairs mostly fine, but occasional coarse tubercle-based stellate hairs occur), 9–13-lobed, 20–27 mm long, segments flattened, free at the base, shorter than or equally as long as the calyx, 0.6–1 times the length of the calyx at anthesis, straight, narrowly but distinctly spatulate, or subulate, with apex entire (lobes sometimes bifurcate in the proximal half). *Calyx* at anthesis not splitting (5-lobed or -partite but not splitting per se), not adnate to the corolla and not falling with it after anthesis, whitish, fine stellate (occasionally coarse) hairs and aculei, moderately dense, evenly distributed on the abaxial surface, lobes narrowly ovate, or narrowly triangular, with prominent marginal ribs, apex acute, 25–35 mm long at anthesis, nectary absent. *Petals* white, some reddish markings towards the base, petal spot small, c. 75–80 mm long. *Staminal column* straight, 5-toothed at the apex, c. 30 mm long. *Stamens* scattered along distal c. 25 mm of the column, inserted singly. *Anthers* dark red. *Pollen* dark red. *Style* one, 5-branched, branches c. 1.5 mm long, exerted c. 4 mm beyond apex of staminal column. *Stigmas* entire, capitate. *Ovary* hairy. *Fruits* dry, dehiscent, a capsule. *Capsules* ovoid, 16–19 mm long with ascending dense hairs, capsule beak present. *Seeds* glabrous, brown with darker spots, c. 4.6 mm long. (Figs 1g–i, 4)

**Diagnostic characters:** Distinguished from Australian members of *Hibiscus* section *Furcaria* by the following combination of characters: evergreen small tree; flattened, often spatulate epicalyx segments; large aculei tipped by a single hair and otherwise short, moderately dense indumentum on the branchlets and leaves.

**Specimens examined:** QUEENSLAND. CSIRO glasshouse, Canberra, ex near Mt Elliot, Townsville area, (coll. Sankowsky s.n.), ii.2000, L.A. Craven 10342 (CANB 875437.1, B75437.2, 875437.3); Mt Storth, 5E of Townsville, 1.ix.1995, R.J. Cummings 13705 (CANB 507214); Atherton Tablelands, Tolga, ex near Mt Elliot, Townsville area, (coll. Sankowsky s.n.), 22.ii–6.iv.2009, G. Harvey s.n. (CANB 798177.1); Ollera Creek Holding near N.P.R. 477, Mt Spec, 17.ii.1972, B. Hyland 5916 (QRS 21252); Mt Elliot, Townsville, ii.2003, G. Sankowsky s.n. (CANB 875446.1, B75446.2).

**Distribution and habitat:** Occurs in north Queensland in open eucalypt forest on granite substrates in the Mt Spec–Townsville district.

**Conservation status:** Restricted in distribution but population sizes are not well documented so the IUCN category Data Deficient (DD) is considered appropriate (IUCN 2012).

**Etymology:** The specific epithet is derived from the type locality, Townsville.

**Notes:** Type material of *Hibiscus townsvillensis* was grown from seed of plants cultivated by G. & N. Sankowsky, at Tolga, Queensland, from living material originally collected from near Mt Elliot, in the Townsville area, Queensland, in June 1998 by G. Sankowsky.

The holotype is mounted on six sheets marked as sheets 1 through 6. As plants are quite large, a single sheet is not sufficient to incorporate all the relevant morphological features and variation present.

***Hibiscus forsteri*** F.D.Wilson in F.D.Wilson & Craven, *Austrobaileya* 4(3): 439–442 (1995), *p.p.*, excluding specimens included under *H. sankowskyorum* & *H. townsvillensis* above.

**Type:** QUEENSLAND. Cook District: 6.8 km from Bromley on the track to Carron Valley, 16 July 1990, *Eucalyptus tetrodonta*–*E. nesophila* woodland on grey, sandy soil, 16.vii.1990, J.R. Clarkson 8866 & V.J. Neldner (holotype: CANB 576920.1, 576920.2 (mounted on 2 sheets); isotypes: BRI AQ0517379, DNA D0064525, K, L, CNS (MBA 758.1), NY, *n.v.*, TEX 00208139).

*Shrub* 1–2 m tall, apparently deciduous. *Branchlets* with fine stellate hairs scattered on the internode; with coarse stellate hairs sparse and sometimes inserted upon tubercles; with aculei 0.5–0.9 mm long, tipped by hairs 0.7–1.2 mm long; with minute sessile glands; the aculei and glands more or less evenly distributed. *Stipules* at length deciduous, unlobed, linear to subulate,



Figure 4. Part of Holotype specimen of *Hibiscus townsvillensis* (Craven 10469, CANB 875440)



with stellate and glandular hairs, 0.6–1.4 cm long. *Petioles* 5–68(–130) mm long; *climax leaves* with the petiole indumentum dissimilar to that of the branchlet, scattered aculei always absent, the fine stellate hairs present only as a longitudinal adaxial band, 1.0–18.0 cm long. Lamina usually weakly discoloured, in general outline elliptic, ovate, narrowly ovate, broadly ovate or orbicular, unlobed to shallowly 3-lobed, 9.0–14(–22.0) cm long, 5.0–10.0(–18.0) cm wide, the base cuneate to truncate, the margin serrate to serrulate (to subcrenulate, with minute teeth in the sinuses), the lobes as long as wide to shorter than wide, the apex acute to rounded (to rarely retuse), the indumentum similar on both surfaces. Abaxial surface with midrib and primary vein indumentum of very sparse stellate hairs and sessile glands, interveinal regions with sessile glands only. *Foliar nectary* present at base of the lamina, 3–9 mm long. *Distal leaves* reduced in shape and size or only in size, narrowly elliptic, elliptic, or ovate. *Flowers* solitary in leaf axils and in short sympodia, not pedunculate, chasmogamous. *Pedice*/with sparse to dense fine stellate hairs, sometimes with sparse aculei, or with scattered to moderately dense coarser stellate hairs inserted upon small tubercles, 13–38 mm long. *Epicalyx* present, persistent, with sparse fine stellate hairs, sometimes with moderately dense coarser stellate hairs inserted upon tubercles (these mostly on the segment margins), 12–20 mm long at anthesis, elongating and 22–31 mm long in fruit, 10–12-segmented, the segments free, 0.65–0.95 times the length of the calyx, incurved, linear, 3-nerved, rounded or flattened in cross-section proximally, variously flattened and widened distally. *Calyx* at anthesis not splitting (5-lobed or partite but not splitting per se), with whitish to yellowish, adaxial indumentum very sparse to sparse fine stellate hairs, sometimes with moderately dense aculei on ribs, or scattered coarser tubercle-based stellate hairs (these mostly on the ribs), 27–40 mm long; abaxial indumentum short, densely pubescent, nectary absent. *Petals* white with a pink flush on one margin, reddish at base, 65–85 mm long. *Staminal column* straight, 20–30 mm long. *Stamens* distributed throughout the length of the column, the filaments 1–2 mm long. *Anthers* dark red. *Pollen* dark red. *Style* one, 5-branched, with branches 4–7 mm long, exerted 10–16 mm beyond apex of staminal column. *Stigmas* entire, capitate, the hairs 0.2 mm long. *Ovary*

hairy. Calyx in fruit not distinctly inflated or accrescent. *Fruits* dry, dehiscent capsule. *Capsules* 19–31 mm long, densely appressed-pubescent, ovoid and beaked, the beak glabrous, conspicuous or inconspicuous, 1–3 mm long. *Seeds* striate and minutely pectinate-pubescent, angular-reniform, c. 4 mm long. (Fig. 1a–c)

**Diagnostic characters:** Distinguished from Australian members of *Hibiscus* section *Furcaria* by the following combination of characters: deciduous shrub; flattened, often spathulate epicalyx segments; large aculei tipped by stellate hairs and otherwise sparse indumentum on the branchlets and leaves.

**Specimens examined:** QUEENSLAND. Cultivated in CSIRO glasshouse, Canberra, ACT, (ex Gray 6896), 4.xi.1997, L.A. Craven 10024 (CANB 00497688); Maloneys Springs, 40 km E by road of Moreton Telegraph Station, vi.1989, P.I. Forster 5234 (ASU, BRI, CANB, MEL, DNA, QRS, n.v.); Near Glennie Mt, Bolt Head Road, off Maloneys Springs Road, vi.1989, P.I. Forster 5518 (ASU, BRI); Maloneys Springs, Bromley Station, vii.1991, P.I. Forster 8792 (BRI, CANB 572828); Old Lockhart-Nundah Road, x.1973, B. Hyland 6947 (CANB 689760, QRS); near Carron Valley turnoff, 15.ix.1983, D.L. Jones 1231, B.E. Mentiplay & K. Black (CANB 665144.1, 665144.2, 665144.3).

**Distribution and habitat:** Apparently restricted to a small area between Bromley Station and Nundah, south of Lockhart River on Cape York Peninsula, where it grows on sandstone substrates.

**Conservation status:** Restricted in distribution but population sizes are not well documented so the IUCN category Data Deficient (DD) is considered appropriate (IUCN 2012).

**Notes:** As the original description of *Hibiscus forsteri* included the taxa named here as *H. sankowskyorum* and *H. townsvillenensis*, a new description was required. The description was revised based on the specimens listed above (including the holotype but excluding the isotypes which were not re-examined).

The holotype is mounted on two sheets marked as sheets 1 and 2. As plants are quite large, a single sheet is not sufficient to incorporate all the relevant morphological features and variation present.

### New combination in *Hibiscus*

The species recognised by Fryxell (2001) as the genus *Talipariti* were characterised by six main morphological characteristics: 1. Large, often ±oblong stipules that are

deciduous, leaving annular scars; 2. Calyx lobes with nectaries at the midribs; 3. Capsules 5-valved, with false dissepiments (appearing 10-loculed); 4. Some species with a cupuliform involucre; 5. Arborescent habit; 6. Broadly ovate or elliptic leaves. Most of these characters are shared with other members of *Hibiscus* s.l. Fryxell (2001: 237) segregated *Talipariti* from *Hibiscus*, claiming that "its phylogenetic affinities are perhaps to be sought elsewhere" – a claim not supported by molecular data (Pfeil et al. 2002; Pfeil et al. 2004). Consequently *Talipariti* was placed in synonymy with *Hibiscus* (Pfeil & Crisp 2005), and accordingly, *H. bowersiae* is here moved to *Hibiscus*.

***Hibiscus bowersiae* (Fryxell) Craven, comb. nov.**

**Basionym:** *Talipariti bowersiae* Fryxell, *Contr. Univ. Michigan Herb.* 23: 237–238, Fig. 3 (2001).

**Type:** PAPUA NEW GUINEA. Western Highlands: Hagen Subdistrict, Kurupili, Kepaka, Upper Kaugal, 7450 ft, 5.ii.1969, N. Bowers 635 (holotype: US; isotypes: A, BISH, BO, BRI, CANB 203877, K, L, PNH, SING, SYD, UH, US).

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